

Delay of Gratification in Two- and Three-Year-Olds: Associations with Attachment, Personality, and Temperament

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Abstract Delay of gratification in young children has been linked to long-term behavioral and academic outcomes. This study explored temperament, personality, and child–parent attachment as possible associates of delay ability. The sample consisted of 50 2- and 3-year-old children and their primary caregivers. Two laboratory tasks, the Preschool Strange Situation and the newly created Gift Delay Task, were conducted on separate occasions to assess child–parent attachment and delay of gratification, respectively. Parents and preschool teachers completed child temperament (EASI-III) and personality (California Child Q-Set) questionnaires. Based on the award-oriented behavior in the Gift Delay Task, children were classified into three groups: Delay (20 %), Touch and Go (i.e., approached the gift, but demonstrated some delay ability; 46 %), and Non Delay (34 %). Reports on activity, impulsivity, decision time, negative emotionality, over-control, and affect were found to be associated with delay ability. The association between child–parent attachment and delay was not statistically significant, but an interesting trend emerged. A larger percentage of Non Delayers were rated as Insecure-Ambivalent (“C”), and more Delayers were rated as Securely attached (“B”). Implications for behavioral interventions focused on parental support and scaffolding are discussed.

Keywords Attachment · Delay of gratification · Personality · Self-control · Temperament

Introduction

One of the hallmarks of early child development is increasing self-control. This competence involves sustaining behavior towards goals in the face of obstacles, and is expressed behaviorally in various ways, including waiting for desired outcomes, resisting temptation, and perseverance when challenged (Bronson 2000; Eisenberg et al. 1995; Mischel et al. 1988, 1989). Self-control deficits are directly relevant to major childhood behavior disorders, including attention deficit and under-socialized aggressive conduct disorders (Martel and Nigg 2006; Olson et al. 1990), and are associated with a variety of other problems of childhood adaptation, peer rejection, delinquency, substance use, and academic achievement (Eisenberg and Fabes 1992; Eisenberg et al. 1993; Fabes et al. 1999; Pelham and Bender 1982; Wills et al. 2006; Vazsonyi and Belliston 2007).

The ability to postpone immediate gratification voluntarily in order to obtain a delayed but preferred outcome is often viewed as a key component of children’s early self-control (Mischel et al. 2003). One of the most extensively utilized approaches for studying delay of gratifications is the self-imposed delay paradigm (Mischel and Ebbeson 1970). In this paradigm, preschool children, typically 4–5 years of age, are asked to indicate a preference between two rewards (e.g., one marshmallow vs. three marshmallows; small gift vs. large gift). Children are then asked to sit quietly and wait in order to receive the more preferred outcome, understanding that they can terminate the waiting period at any time and receive the less

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preferred reward. For more than three decades, researchers have used variants to this paradigm to examine the cognitive and contextual factors that impact children's waiting (for a review, see Mischel 2012). These studies reveal that how long a child waits for desired outcomes is a product of both the challenges put forth in the delay situation and the strategies children use to cope with those challenges (Peake et al. 2002).

Interest in delay of gratification has intensified due to longitudinal findings indicating that preschool waiting is related to adolescent and early adult functioning. Mischel et al. (1988) first reported correlations indicating that children who delayed gratification during preschool were perceived by their parents as adolescents who were more cognitively competent, socially competent, and able to cope with stress than their counterparts that did not wait. This pattern was evident both in direct ratings of these questions by parents as well as profiles of correlates from the California Child Q-set. Subsequently, Shoda et al. (1990) showed early waiting in some variations of the self-imposed delay paradigm showed even more powerful linkages to adolescent functioning, including the ability to predict SAT scores. Ayduk et al. (2000) further showed that these patterns extend to early adulthood mediating various interpersonal difficulties (aggression, peer rejection) and adaptive functioning (low self-worth, drug use).

The identification of preschool individual differences in delay of gratification with enduring longitudinal consequences raises important questions about the possible precursors of these differences. As noted previously, the self-imposed delay paradigm is used almost exclusively with 4- and 5-year-old preschool children. If individual differences are in place among these preschoolers, what is their source? To what extent are these differences influenced by biological underpinnings (as often described in the temperament or personality literatures)? Are the differences in delay ability at age 4 the products of differential socialization and family experiences?

These questions are difficult to address since virtually no research utilizes the self-imposed delay paradigm with children younger than 4 years old. The absence of work using the paradigm with very young children can be understood both in pragmatic and conceptual terms. Pragmatically, the self-imposed delay paradigm presents the child with a set of somewhat complex contingencies that the child must fully comprehend. Most critically, to obtain the desired outcome the child must wait alone, an activity that can be quite stressful for young children. The child must further learn how to signal the researcher to return to the room (typically by ringing a bell), and the child must understand the consequence of this action (receipt to the less preferred reward). Indeed, it is the child's understanding of these contingencies that makes this paradigm

“self-imposed”: the child's own choice to wait or not to wait determines the outcome received.

Work within this paradigm suggests that children younger than 4 years old have considerable difficulty understanding and retaining the contingencies of the delay situation (Mischel and Mischel 1983). Children younger than 4 often have difficulty conversing with unfamiliar experimenters, making it difficult to assess whether they fully comprehend the instructions. The understanding of these contingencies is so critical to the paradigm that they are rehearsed repeatedly before the wait begins and then tested after the session is completed. Typically, delay data are not included in analyses unless children can accurately recall the delay contingencies.

Beyond the complexity of the self-imposed waiting task, there are developmental reasons that delay is not typically studied in children younger than 4 years of age. A number of theorists believe that children's flexible monitoring, and the ability to delay independently, does not develop until the fourth year of life with the appearance of representational thought and recall memory (Grolnick et al. 1996; Kopp 1982). Yates et al. (1987) found that children younger than four are not aware of the basic “rules” of delay. The 4-year-olds evidenced minimal constructive knowledge of effective delay strategies, but the majority of 6-year-olds knew of the value of thinking happy thoughts and of avoiding sad thoughts. There have been many studies linking self control to preschoolers' developing cognitive capacities, including selective attention, understanding the effect of temporal aids, and cognitive representation (Bandura and Mischel 1965; Grolnick et al. 1996; Mischel and Ebbesen 1970; Mischel and Moore 1973; Moore et al. 1976; Peake et al. 2002; Schack and Massari 1973; Sethi et al. 2000; Yates et al. 1987). Following this developmental knowledge, most studies in the field have been limited to children between the ages of 4 and 8 years.

This is not to say that researchers have not attempted to study self-control in younger children, just that they have not used the self-imposed delay paradigm in that study. Instead, researchers typically use compliance and/or resistance to temptation procedures to examine toddler self-control. In these paradigms, children might be introduced to a highly attractive toy and then told that they should not play with the toy during a free play session. Compliance with this request is measured in terms of how long the child resists the temptation to play with the desired object (e.g., Grolnick et al. 1996; Silverman and Ippolito 1995). Other compliance protocols offer no attractive reward for children's ability to follow instructions (as described in Kochanska et al. 1997). Very young children are capable of understanding instructions to comply. However, compliance tasks differ from the traditional delay study in that the demand to display restraint is externally rather than self-imposed. Peake et al. (2002)

showed that among 4-year-olds, compliance measures produce a pattern of correlates that is quite distinctive from those obtained with the self-imposed delay task, suggesting that these two putative measures of self-control are likely tapping into distinctive psychological processes in young children (see also Miller and Karniol 1976).

Despite these developmental limitations, the desire to understand the gradual acquisition of abilities in combination with some set of biological underpinnings that support the delay of gratification remains a matter of more than academic curiosity. Given the importance of self control for young children's readiness to learn in group environments (as commonly found in preschool settings, including turn taking or attending to scheduled curricular activities over unstructured free play) this desire to understand has powerful implications for early intervention and education efforts.

Possible Precursors of Self-Imposed Delay

Given that enduring and consequential individual differences in delay appear to exist by the fourth year, what might be their source? Calkins (2004), in reviewing developmental views of self-regulation, notes that researchers tend to appeal to either intrinsic or extrinsic factors in understanding early self-control. Those investigating intrinsic factors tend to appeal to very early innate physiological differences that are frequently expressed as temperament differences (Kopp 1982). These temperamental differences are believed to be the formative components of early differences in children's personality (Rothbart et al. 2000). In this tradition, Posner and Rothbart (1998) have described how temperamental differences in attentional control are linked to the development of effortful control, which is posited to guide many aspects of early self-regulatory performance (see Eisenberg and Spinrad 2004). This perspective is consistent with earlier efforts by Block and associates to account for self-control differences by appealing to early individual differences in personality centered on the variables of ego-control and ego resiliency (Block and Block 2006). As noted above, the formal operationalization of self-control in these approaches relies extensively on measures of compliance and resistance to temptation.

An alternative way of searching for the precursors of self-imposed delay is to examine extrinsic factors, including how caregivers mold the emotional responses of young children (Calkins 2004; Thompson 1994). Silverman and Ippolito (1995), Jacobsen et al. (1997) suggest that self-regulation might be heavily influenced by environmental factors, such as the parent's ability to encourage delay in children by providing direct coaching and leading the child through the process. A key concern of theorists and

researchers taking this approach is the role that early attachment might play in the development of self-control.

There are only a handful of studies that have examined the role of early familial relations on children's self-control. Olson et al. (1990) conducted a multi-method assessment of mother-child relationship, primarily focusing on the observed relationship qualities in the home during the first 2 years, and related it to children's impulse control capabilities at age six. Findings indicated that responsive, cognitively stimulating parent-toddler interactions in the second year modestly predicted later measures of cognitive non-impulsivity and ability to delay gratification 4 years later. Additional studies have looked at the relationship of mother-child interactions through attachment measures and the child's subsequent ability to delay gratification. Jacobsen et al. (1997) examined mother-child attachment patterns in toddlers and 6 year old children and found a relation between attachment style and delay of gratification at 6 years of age. Secure children tended to delay longer than insecure-disorganized children, although this relation was strongest when attachment and delay were assessed concurrently. In a similar vein, Sethi et al. (2000) found that toddlers that distanced themselves from controlling mothers during a Strange Situation were more effective delayers at age five than those that did not distance. The opposite pattern was noted for toddlers with non-controlling mothers. Sethi et al. also found that children who used distraction (or attention deployment) to cope with maternal separation as toddlers showed less negative affect in the Strange Situation and were more effective waiters at age five. A noteworthy aspect of each of these studies is that parent-child interactions of toddlers are used to predict delay of gratification 3 or 4 years later. None of the studies assess delay ability concurrently, perhaps for the pragmatic and conceptual reasons cited previously. However, all suggest an enduring linkage between the quality of the maternal-child relations in toddlerhood and subsequent ability to wait.

Attachment as a behavioral control system maintains a homeostatic balance between proximity-seeking and exploratory behavior, depending upon both internal state and environmental demands (Bowlby 1969/1982). Between their second and third birthdays, children come to realize that others have their own feelings, goals, and plans; by their fourth birthday, most children are able accurately to distinguish between their own and others' perspectives, and simultaneously maintain both perspectives in awareness while assessing whether or not they match (Marvin and Britner 2008). These are component skills that allow the child and caregiver both to take responsibility, when their goals or plans conflict, in negotiating in a goal-corrected way toward a shared set of plans (Bowlby 1969/1982).

In the preschool years, attachment insecurity predicts a variety of problems, including peer difficulties, overdependence

on teachers, low self-confidence, and poorer social competence and adjustment (Britner et al. 2005). Self-regulatory processes that emerge in the context of attachment relationship, such as selective attention, the use of working memory, self-control, and interactions with adults, carry forward into cognitive and social tasks that children encounter in school (Pianta and Harbers 1996). Children with insecure, intrusive child–parent relationships may demonstrate poor problem-solving and experience poor instruction, distorted feedback, and feelings of frustration (Pianta 1997). Ainsworth et al. (e.g., 1978) have focused on maternal responsiveness (consistent, prompt, and accurate) to infant-initiation as the single most important issue in the development of secure infant attachment. In preschool, however, there may be more of an issue of knowing when and how to scaffold or “teach” at an appropriate but challenging level, assist without pressuring to achieve, and balance those times of involved play with opportunities for independent (yet supported) exploration.

Present Study

The present study is among the first to study associations between parent–child relationship quality, temperament and personality, and delay of gratification outcomes in preschool-aged children. Our research questions follow from the literature presented thus far: First, are self-imposed delay differences observable in children younger than 4 years of age? Second, if younger children do indeed show differences in waiting ability, are these differences related to the child’s temperament and/or personality traits? Third, are observed differences related to the child’s attachment to their primary caregiver? Finally, are differences in children’s delay ability linked to differences in the affective and behavioral strategies they use? We hypothesize that children as young as 2 years of age will be able to exhibit some form of delay understanding and ability; that attachment quality, temperament qualities, and personality traits are correlated to children’s ability to wait; and that children’s observable strategies for waiting are related to the success of their attempts to delay gratification.

Method

Sample

Fifty ($N = 50$) 2- and 3-year-olds and their primary caregivers participated in the study. The selection criteria included the children’s age and the availability of the parent for two laboratory tasks. Samples of 21 children (11 boys and 10 girls) and 29 children (16 boys and 13 girls) were recruited at the child development laboratory

preschools at two public universities in the Northeast US. Parents were asked to complete a demographic survey with questions regarding their age, education, occupation, family income, and the sex and age of other family members in the home. This information was used to describe the sample. Twenty-one of the children were 2 years old; 29 were 3 years old. The majority of the children were White (72 %); others were Black/African American (16 %), Asian/Asian American (8 %), and Latino/Hispanic (4 %). The two preschool samples were subsequently merged because there were no significant site differences in the demographic child or family characteristics.

Two fathers and 48 mothers, predominantly of middle income and highly educated, participated in the study as the primary caregivers for their children. Most parents had undergraduate and/or graduate college degrees (92 %). Most parents worked full time, except for four (8 %) who were students and five (10 %) who were working part time. The average income of the families was between \$40,000 and \$60,000 a year. Eighteen percent of the parents were single (never married or divorced); all others were currently married.

Procedures

After necessary IRB approvals were obtained, flyers describing the study aims and the two lab tasks were distributed to all parents of 2- and 3-year-olds at both preschools. Parents who were interested in participating were given informed consent forms to sign and return to the classroom teachers. Once the consent forms were obtained, parents were contacted directly to set up an appointment for the first laboratory task; during this visit parents filled out the demographic information sheet.

Both the laboratory tasks (Preschool Strange Situation and Gift Delay Task) were conducted on the school premises. An observation room with a one-way mirror was used to run the two laboratory procedures, described in detail, below. Parents were briefed on the various episodes of the task and the signals for them to leave the room. Three trained researchers conducted the tasks; one operated the camera from behind the one-way glass, one was the experimenter (person familiar to the children), and one researcher acted as the stranger (person not known to the children). The parent also stayed in the observation room when not with the child to observe his/her child throughout. After the Preschool Strange Situation was completed, a second appointment—typically within 1 week—was arranged to conduct the Gift Delay Task. Again, the parent was debriefed on the task. After the completion of the Gift Delay Task, the parents were briefed and then handed the two questionnaires (EASI-III and CCQ) to be completed and returned.

Measures

Attachment Behavior

The Preschool Strange Situation (Cassidy and Marvin 1992) was used to evaluate child–parent attachment in a laboratory setting. The preschool procedure is a modification of the Ainsworth Strange Situation procedure for separations and reunions with infants (Ainsworth et al. 1978). The attachment coding is primarily based on the parent–child reunions. Following the Ainsworth tradition, the MacArthur Working Group developed a system of attachment classification for children 2–6 years of age based on behavioral indicators like physical contact, body positioning, content and style of parent directed speech, looking behavior directed to the parent, and verbal and nonverbal indices of affect. The resulting five-category system includes the three traditional categories of Insecure-Avoidant (A), Secure (B), Insecure-Ambivalent (C), and adds Disorganized/Controlling (D) as used by Main and Solomon (1990). A fifth category of Insecure-Other (IO) was added and is used for cases in which no other classification is possible, or if the case is a mix of two or more insecure category characteristics (Cassidy and Marvin 1992).

Inter-rater reliability on the Cassidy and Marvin system is typically high, with agreement at the major class (5 group) level in the range of 75–85 %, and agreement being higher for the secure-insecure classification (e.g., Marvin and Pianta 1996). Validity data from a number of recent studies have shown the preschool system to be related to concurrent social competence, behavior problems, Adult Attachment Interview classification, and a number of risk factors (e.g., Lyons-Ruth et al. 1991; Solomon and George 1999; Stevenson-Hinde and Shouldice 1995; Teti 1999).

Delay of Gratification

A laboratory Gift Delay Task was used to assess the children's delay of gratification. The general procedure for the Gift Delay task follows the standard self-imposed delay procedure with older children (e.g., Mischel et al. 1992) for the past three decades. This standard procedure incorporates in part the “attractive gift” procedure used by Grolnick et al. (1996) and was modified by the authors to parallel the child–mother, child–stranger, and child alone episodes of the Strange Situation. Briefly, the procedure used in this study includes the following sequence:

- (1) The experimenter shows the child two gifts, a small one wrapped in an ordinary brown paper, and a large one decoratively wrapped. Children are asked which of the two gifts they would prefer to receive. Children are told that if they wait until the experimenter returns, they

may have the preferred gift. If, however, they cannot wait until the experimenter returns, they may have the smaller gift at any time. After rehearsing these contingencies with the child, the experimenter leaves the room taking the large gift with her and leaving the small gift on the table in front of the child.

- (2) Parent and child are left to deal with this information in whatever manner they see appropriate; the parent is given no additional instructions.
- (3) 3 Min later, a stranger enters the room and sits quietly.
- (4) After 3 min the mother leaves, and the stranger and child are left in the experimental room; this episode is truncated if the child becomes distressed.
- (5) After 3 min, the stranger leaves the room and the child is left in the play room alone; again, this episode is truncated if the child becomes distressed.
- (6) After 3 min, the parent rejoins the child.
- (7) 30-s Later, the experimenter enters with the large gift.

In all, children were required to wait just over 12 min to receive the preferred reward. Their behavior was continuously monitored during this time. If the child opted for the small gift at any time in the procedure, typically by grabbing and opening the bag, the experimenter would briefly return, explain the contingencies to the child again, and give the child a second chance to wait for the larger gift. If the child chose not to continue waiting, the procedure was terminated. If the child chose to continue to wait, the small gift was returned to the table and the experimenter exited the room.

Delay behavior was categorized based on the reward-oriented behavior of the children. Some children opted for the larger gift and waited for it throughout; these children were classified as Delayers. Other children opted for a larger gift in the beginning, but could not wait during the task and opened the gift in front of them. When presented with the opportunity to wait longer, some of these children chose not to wait and were classified as Non Delayers. The third group consisted of children who touched or reached for the gift initially but then—given a second chance by putting the gift back in the bag—waited till the end of the task. These children were labeled as Touch and Go, indicating a third level of ability to delay gratification. These children exhibited strong inhibitory control as they were able to suppress an already initiated approach response but could not be combined with the delayers who made up their mind in the beginning and did not deviate throughout. Observations of the child's behavior during the Gift Delay Task were used to assess the child's ability to delay gratification for the preferred gift; attention to the task; and, the child's primary affect (i.e., boredom, distress, relaxed, restless, excited/eager, or happy). Observations of the parent's behavior were coded separately (see Russell et al. 2012 for results).

Temperament and Personality

Parent and preschool teacher perceptions of child temperament and personality were gathered using the Buss and Plomin's (1975) EASI-III and the California Child Q-Set (CCQ) (Block and Block 2006; Shoda et al. 1990), respectively. The underlying components of the temperament and personality questionnaires have overlapping components, such as impulsivity, but they also capture numerous other constructs that are mutually exclusive. Taken together, they address an array of constructs related to delay of gratification and thus complement one another. The EASI-III has a total of 50 items that are divided into four scales: Emotionality, Activity, Sociability, and Impulsivity. These are further subdivided into ten sub-scales, thusly: Emotionality (General, Fear, Anger), Activity (Tempo, Vigor), Sociability, and Impulsivity (Inhibitory control, Decision time, Sensation seeking, Persistence). Parents and teachers rated each item (e.g., "Child is easily frightened") on a scale from 1 ("strongly disagree") to 5 ("strongly agree"). The EASI-III has a confirmed, simple factor structure (Buss and Plomin 1975), in contrast to many other self-report measures, and the scale has good reliability with alpha scores ranging from .69 to .8.

The CCQ is an age-appropriate modification of the California Q-set (Block and Block 1969), consisting of 100 items. Some of these items are directly relevant to issues of self-control, delay, and impulsivity (e.g., "Is planful, thinks ahead" and "Is restless and fidgety"). For each of the items, the parent and teacher independently rated the child on a scale from 1 to 9, indicating how descriptive each item is of his/her child. Reliability and validity data for the CCQ are presented by Mischel et al. (1992).

Analysis

The two lab procedures were coded by independent sets of two trained, reliable coders. Each of the four coders was blind to all other codes. Child–parent attachment was coded from the videotaped Preschool Strange Situation, following the coding procedures manual developed by the MacArthur group (Cassidy and Marvin 1992). The coding includes an attachment code (5 major classifications), a security rating (1–9) and an avoidance rating (1–7). The coder was trained in the coding system in Virginia by Dr. Robert Marvin and subsequently passed the reliability test for certification. This coder completed the entire sample's coding for child attachment. To establish reliability, a subsample of 25 % was coded by a second certified coder. The established inter-reliability for this sample was over 90 %.

The Gift Task was coded by two trained coders under the direction of Dr. Philip Peake. The coding procedure consisted of frequency counts done separately for each

episode (total # of episodes = 7) for each of the following seven aspects of the children's behavior: award-oriented behavior (taking, touching/reaching for, commenting); interaction with the caregiver, experimenter, and stranger; reaction to episode change; and affect (bored, distressed, jittery/restless, relaxed). The videotapes for each child were viewed several times to count the frequency of each movement or gesture. Inter-rater reliability for two independent coders exceeded 80 % exact agreement.

The responses on the questionnaires were entered and analyzed according to the guidelines provided by each questionnaire's authors. For example, for the EASI questionnaire, certain items had to be reverse-coded for the analysis. For the CCQ, the scores were transformed into *z* scores for each subject before analyses commenced. The standardized program is run on the *z* scores, and several trait composites are generated (e.g., Block's ego control and resilience scale).

Results

Delay of Gratification in a Laboratory Setting

Children's gift oriented behavior was used to classify them in one of the three groups. The frequencies of the delay classifications are presented in Table 1. A considerable minority of the children (20 %) were able to delay gratification, and a majority of the children (66 %) were either in the delay or the intermediate (touch and go) group. Group differences in delay status were assessed based on age and sex children. 2 Year-olds who could delay gratification made up a smaller percentage of the sample than 3 year-old Delayers (6 vs. 14 %); this pattern did not hold for Non Delayers (18 % of the 2-year-olds and 16 % of the 3-year-olds). A large percentage of children from both age groups were in the Touch and Go group (18 % of the 2-year-olds and 28 % of the 3-year-olds). The difference between the two age groups was not statistically significant (2 *df*, Pearson Chi-Square = 1.50, *p* = .47). Similarly, there was no significant difference between the girls and boys on delay status (2 *df*, Pearson Chi-Square = 1.60, *p* = .45). Twenty-six percent of girls and 15 % of boys Delayed, and 48 % of girls and 44 % of boys were in the Touch and Go group; twenty-six percent of girls and 41 % of boys were Non Delayers.

Affect Differences in the Three Delay Groups During the Gift Task

Affect was coded by counting the occurrence of each category of facial expressions for each of the seven episodes. Oneway analysis of variance was used to test group differences on affect, as seen in Table 2. Post hoc

Table 1 Categories of delay of gratification ability

Category	Delay ability	Number of children
Delayers	Looks and comments but does not touch the bag	10 (20 %)
Touch and Go	Touches, reaches for initially, does not touch the bag given a second chance	23 (46 %)
Non delayers	Takes available bag initially, takes the bag again during the second chance	17 (34 %)

Table 2 Affect displayed by non-delayers (ND), Touch and Go (T&G), and delayers (D)

Affect	Pattern of display*	<i>F</i> (2, 47)	<i>p</i>
Boredom	ND > T&G > D	3.77	<.05
Distress	ND > T&G > D	7.32	<.01
Relaxed	D, T&G > ND	11.73	<.01
Jittery/restless	ND > D, T&G	14.98	<.01
Excited/eager	ND > D, T&G	2.24	<.10
Happy	D, T&G > ND	2.25	<.10

* Group differences were tested using post hoc SNK comparisons

comparisons revealed that during the Gift Task, Non Delayers were more bored, distressed, and jittery/restless, and less relaxed, than were the children classified in the Delayer or Touch and Go groups. There were no significant differences between the Delayer and Touch and Go groups, except that the Delayers showed even less boredom and distress than did the Touch and Go group.

Factors Associated with Delay

The relationship of child temperament to delay of gratification was examined using oneway ANOVAs on the four major scales and nine subscales of EASI-III. Parents’ reports of child’s Activity ($F(2, 47) = 2.32, p < .10$, and, Activity-Tempo ($F(2, 47) = 3.5, p < .05$) revealed that Non Delayers were more active than the Touch and Go group ($p < .05$). There was no difference between the Touch and Go group and the Delayers. Additionally, teachers’ reports of Emotionality ($F(2, 47) = 2.47, p < .05$), Emotionality-General ($F(2,47) = 3.67, p < .05$), and Impulsivity-Decision time ($F(2, 47) = 2.70, p < .05$) showed that the Touch and Go children scored higher on negative emotionality as compared to the Delayers, both at the scale and subscale levels. In terms of Impulsivity-Decision time, Non Delayers had lower decision time as compared to the Touch and Go group ($p < .05$). See Table 3.

Parents’ reports on child personality on the CCQ were not associated with children’s delay ability, but on teachers’ reports showed significant associations with delay ability on 9 scales. Post hoc Student–Newman–Keuls (SNK) tests revealed that on the dimensions of over-control and extraversion Delayers were rated higher than the Touch and Go group, whereas on irritability they were rated lower than the

Table 3 Temperament and delay classification

EASI scales and subscales	Delayers Mean (SD)	Touch and Go Mean (SD)	Non delayers Mean (SD)
Emotionality	2.8 (.49)	2.7 (.42)	2.8 (.54)
General	3.2 (.56)	2.9 (.52)	3.2 (.77)
Fear	2.5 (.56)	2.5 (.55)	2.4 (.51)
Anger	2.7 (.71)	2.5 (.55)	2.7 (.9)
Activity	3.2 (.62)	3.0 (.45)	3.4 (.53)
Tempo	3.0 (.71)	2.7 (.52)	3.2 (.63)
Vigor	3.4 (.58)	3.4 (.51)	3.6 (.54)
Sociability	4.0 (.40)	3.8 (.56)	3.9 (.57)
Impulsivity	2.9 (.19)	2.8 (.24)	2.9 (.35)
Inhibitory control	2.7 (.48)	2.5 (.34)	2.7 (.54)
Decision time	3.4 (.75)	3.3 (.57)	3.4 (.53)
Sensation seeking	2.8 (.51)	2.7 (.48)	2.8 (.37)
Persistence	2.7 (.59)	2.5 (.6)	2.6 (.47)

Touch and Go group. On dimensions of delay of gratification, obedience to authority, conscientiousness, and agreeableness, Touch and Go children were rated higher than Non Delayers. Non Delayers were rated highest on under-control and lowest on positive affect. See Table 4.

In terms of the relationship between child–parent attachment and delay, comparisons revealed that the three delay groups were not significantly different from each other at the major 5-category level of attachment, as seen in Table 5 (6 *df*, Pearson Chi-square = 8.83, $p = .18$). Post hoc comparisons of the distributions in this small sample, however, indicated that there were more children with Insecure-Ambivalent attachments (5) in the Non Delay group as compared to the other two groups, whereas there were more Secure (17) and Insecure-Avoidant children (5) in the Touch and Go group as compared to the other two.

Discussion

The data from this study are among the first to suggest that effective delay operates before the age of 4 years, the historic age point for most research on self control. Although there was a developmental trend toward more Delayers among the 3-year-olds than among the 2-year-olds, there were a number of toddlers and preschoolers who

Table 4 Personality and delay classification

CCQ scales and subscales teacher reports	Delayers Mean (SD)	Touch and Go Mean (SD)	Non delayers Mean (SD)
Over-control	.16 (.13)	.29 (.19)	.14 (.14)
Extraversion	.92 (.25)	.78 (.26)	.91 (.23)
Irritability	-.41 (.51)	-.78 (.26)	-.54 (.4)
Delay of gratification	.63 (.23)	.71 (.17)	.56 (.21)
Obedience to authority	.43 (.26)	.56 (.22)	.37 (.21)
Conscientiousness	.37 (.2)	.56 (.24)	.32 (.29)
Agreeableness	.72 (.27)	.74 (.23)	.63 (.18)
Under-control	.17 (.28)	-.06 (.17)	.18 (.23)
Positive affect	.72 (.37)	.81 (.22)	.94 (.28)

delayed gratification for a period of time. These results support our first hypothesis concerning a younger age at which some children are capable of waiting. It is now important to conduct longitudinal studies to examine characteristics of delay of gratification during early childhood. Does ability to delay in toddlers persist to age 4 or 5? Do toddlers who are non-delayers or intermediate (in the touch and go group) become able to delay gratification? Which toddlers struggle with delay well into their preschool and early childhood years, and what might the predictors of that be? Clearly, if delay ability develops at earlier ages, it may be possible to encourage delay ability through early intervention services.

Temperament differences among the three delay groups represent another interesting finding. Whereas high activity and low decision time was found to discriminate between Non Delayers and Touch and Go children, ratings of the child's Emotionality were found to distinguish Touch and Go children from Delayers. Shoda et al. (1990) found a strong relationship between inhibitory control and toddlers' self control in face of temptation, and Metcalfe and Mischel (1999) similarly suggest that there may be facets of cognitive control (like those found in attention deployment) that may predispose children towards overcoming temptation through a preference for distraction strategies geared towards inhibiting impulsive responses.

The results on child personality from the CCQ indicate that the characteristics associated with optimal self-

regulation, delay of gratification, obedience to authority, conscientiousness, and agreeableness were found to be lower in Non Delayers and higher in the Touch and Go group. Even though this sample was drawn from a non-clinical population, these characteristics have been associated with long-term behavior problems like conduct disorder, externalizing behavior problems and even psychopathology. Hart et al. (1997), Newman et al. (1997), Robins et al. (1996) identified groups of under-controlled Icelandic, European American and African American, and New Zealand children, respectively. In all three studies, under-controlled individuals were prone to problem behaviors, concurrently and in later adolescence or adulthood. Also, neuroticism and associated low attentional regulation have been related to proneness to anger (Derryberry and Rothbart 1988), externalizing problem behaviors and conduct disorders (Eisenberg et al. 1996), aggression (Hart et al. 1998), and psychopathology (O'Brien and Frick 1996). Thus, high negative emotionality, activity, neuroticism, and under-control, along with low delay of gratification, obedience, over-control, conscientiousness, and agreeableness is a combination of traits that seems to have short- and long-term behavioral implications.

Child-parent attachment in the Strange Situation demonstrated some associations with children's delay ability, although these were not statistically significant in our relatively small sample. There were more Secure and Insecure-Avoidant children in the Touch and Go group as compared to the Non Delay group, and there were more Insecure-Ambivalent children in the Non Delay group. This indicates that Secure and Avoidant children, although initially tempted (i.e., they reached for/touched the gift initially) were then able to devise a strategy for waiting until the end of the task, whereas the Insecure-Ambivalent children failed to do the same.

Securely attached children are generally interested in exploring and interacting with the parent. They like their parents to be involved, and appear to have a very special relationship with the parent, with interaction that is smooth, full, warm, and positive. These trends are also supported in the delay of gratification literature: Secure children work towards the goal of delaying by mutual involvement (Marvin and Britner 2008). Silverman and Ippolito (1995) found that parents influence delay ability by allowing,

Table 5 Attachment and delay classifications

Delay classification	Attachment				Total
	Insecure-avoidant (A)	Secure (B)	Insecure-ambivalent (C)	Disorganized (D)	
Delayers	2	6	1	1	10
Touch and Go	5	17	1	0	23
Non delayers	2	8	5	2	17
Total	9	31	7	3	50

encouraging, and supporting the child in taking responsibility for his or her own behavior.

The general, strategy guiding the behavior of an Insecure-Avoidant child is minimization or avoidance of interaction which might call attention to the relationship. Therefore, the child neither tends to share a joyful or relaxed “intimate moment” at reunion with the parent, nor calls attention to the relationship by being punitive or stubborn or by refusing to answer when social convention clearly calls for a response (Cassidy and Marvin 1992). Avoidant children have the strategy of acting independent and minimizing parental involvement by creating a mental wall between themselves and others. Thus they may be able to resist temptation to the gift using a similar approach—by moving their attention away from the gift thereby creating a more familiar psychological distance. Metcalfe and Mischel (1999) present a framework similar to this by classifying willpower processes into “hot” and “cool” systems that either promote impulsive/reflexive action or neutral self-control behavior. In this framework, children who can distract themselves away from the temptation in the room are utilizing “cool” systems to self-regulate.

Insecure-Ambivalent children are more likely than others to clamor for attention, to want to be held, and to show other dependent behavior. Their preoccupation with the parent and inability to have any strategies needed to function independently is associated with their inability to delay gratification. Using a compliance task, Howes and Olenick (1986) observed children at four ages (18, 24, 30, and 36 months) on a toy clean up task and found that resistance to the task was associated with mother–child over-involvement with each other. Luria (1961) emphasized that besides temperamental and personality influences, self-control depends upon individual skills developed during social exchange with familiar social partners (especially primary caregivers). According to Luria, “repeated interpersonal coordination eventually leads to the internalization of self-directed speech which enables children to adequately regulate ongoing activity” (p. 62). Thus, parental role in children’s delay of gratification and in self-regulation in general, requires further researched so that effective interventions at home and school can be implemented.

Limitations

One of the major limitations of this study is its generalizability due to a lack of diversity in ethnicity, socioeconomic status (SES), parental education level, and family structure. Studies in the field (e.g., Lynwood 1990) have suggested that measures of children’s ability to delay gratification may be influenced by SES. This warrants

further investigation, particularly for single-parent families or those that face higher-order restraints on parents’ available time and attention resources for interactions with their young children (i.e., life course variables including under employment, mental health struggles, for example). Further research with a wider demographic array of children and families will be necessary in order to replicate the findings.

The findings reported here are based on a small sample of children and their caregivers, so there is a need to replicate them with a much larger sample. Many of the findings are potentially interesting, but statistically weak. A larger sample would give greater power for detecting small to moderate effects. Additionally, there is a need to explore other potential variables that are theoretically linked to the ontogeny of delay ability. For example, maternal sensitivity and responsiveness has been associated with children’s self-regulation (Baumrind 1979), as have warmth, strictness, and aggravation (Silverman and Ragusa 1990). These parenting variables are worthy of further investigation.

Conclusion

What is the role of socialization in the development of the delay of gratification? Recent consideration of the sources of socialization and their impact on self control indicates that close relationship influences are significant (Nofziger 2008; vanDellen and Hoyle 2010; Vazsonyi and Belliston 2007; Vazsonyi and Huang 2010), and although this work is focused on the study of delinquency, the same social-cognitive theoretical underpinnings that led investigators to consider social influence on self control are equally relevant to young children in normative contexts (i.e., waiting rather than vandalism). The present study builds on work by Eisenberg et al. (2005) to expand on the extrinsic influences that complement traditional consideration of temperament and personality; specifically, that attachment quality may have early implications for the ontogeny of self control. Results from this work also indicate that investigations of self control with younger samples of children are warranted and support previous findings on the intrinsic qualities correlated with the delay of gratification in older children. Future longitudinal research in the early childhood years will be necessary to untangle these influences and guide intervention strategies for the promotion of children’s delay of gratification and self-control abilities.

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